

Introduction to Photography:

The word photography was derived from two ancient Greek words 'phōs' & 'graphé'. The word Photo was derived from the Greek word 'phos' which means '**light**' and graph from the Greek word 'graphé' which means '**drawing**'. Combining the two Greek words into the word 'photography' which means "Drawing with light".

What is Photography?

Photography is the process of capturing an individual's visual through a mechanical or digital medium on a film or digital sensor, which can be stored physically(films & hard disk) or printed on paper is known as photography.

Importance of Photography:

Memory fades and the details become fuzzy and you will try to remember all of the details of a time and place; however, your memory will build those details as it wishes not as it really was. That is the reason it is important to archive memories not just in our mind but in photographs to pass those moments on to our families, friends and to future generations.

Role of Photography:

Photography plays a major role in history and in the future. The family photographer, war documentarians, photojournalists all has one of the most important jobs in the world; they archive the photos for the future. With new technology and social media platforms photography plays an important role. Photos spread across the world in a matter of seconds allowing the opposite ends of the Earth to come together to view what they otherwise would have to wait to see on TV. Visual documentations of important events are now seen as they happen, in real time.

(Photography is not mere capturing visuals it is capturing memories.)

Photos give us the exact idea about the visual of the product or scenario. The more appealing the photographs, better 'Brand reach' it gets. Without photos we tend to start to build our own imagination of the product or scenario which can be sometimes exaggerated by the listener/reader and when they see the product in reality it doesn't justify to their imagination. Thus photographs are very important to give the exact idea about the products or scenario.

For example, when an individual is selling a used product on OLX he gets more brand reach if he uploads the photos of the product he is selling.

(Brand reach: The ability of the brand to present itself to prospective customers)

Styles of Photography

Art Photography:

Also known as "fine art photography", "artistic photography" and so on, the term "Art photography" has no universally agreed meaning or definition: rather, it refers to an imprecise category of photographs, created in accordance with the creative vision of the photographer. The basic idea behind the genre is that instead of merely capturing a realistic rendition of the subject, the photographer is aiming to produce a more personal - typically more evocative or atmospheric - impression. One might simplify this, by saying that fine art photography describes any image taken by a camera where the intention is aesthetic rather than scientific (photos with scientific value), commercial (product photos), or journalistic (photos with news or illustrative value). Today, photography is exhibited in many of the best galleries of contemporary art around the world.

(<http://www.visual-arts-cork.com/fine-art-photography.html>)

Documentary Photography:

Documentary photography usually refers to a type of professional photojournalism, but it may also be an amateur or student pursuit. The photographer attempts to produce truthful, objective, and usually candid photography of a particular subject, most often pictures of people. The pictures usually depict a certain perspective of the photographer. Usually such photographs are meant for publication, but are sometimes only for exhibition in an art gallery or other public forum. Documentary photography follows a single topic or story in-depth over time, which deepens our understanding and emotional connection to stories of injustice, documentary photography can capture and sustain public attention, and mobilize people around pressing social and human rights issues.

Commercial Photography:

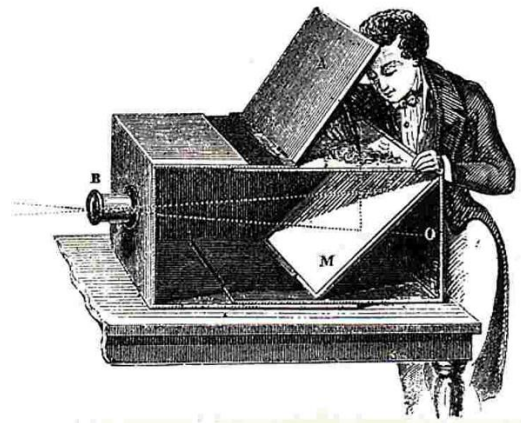
Commercial photography involves taking pictures for commercial use: for example in advertisements, merchandising, and product placement. Commercial photography is also used in corporate brochures and leaflets, menus in cafes and restaurants, and similar commercial uses where photographs enhance a text. Commercial photography is used to promote or sell a product or service. There are a number of ways that photographs can be used to better market products and corporations. For photographers who excel at commercial photography, it can be a very lucrative market, and the field of commercial photography is broad. Product commercial photography reveals the detail and feel of a product to the customer, while advertising commercial photography is more likely to focus upon the status and attractions of the product.

History of Photography

Since ancient time man could see the moon, the surroundings, his own image in the form of reflection in the water, but he had no means to capture the visuals on any medium. He could only carve or paint his visual on the rocks and other surfaces. As humans evolved with time, they learnt the art of sketching and drawing on many different mediums. They explored different techniques which could help them to improve their art form. Many artists used the principle of 'camera obscura' which helped them to draw faster and more accurate picture of the scene. The same principle was used in the construction of a Pin-hole camera.

Camera Obscura:

The principal of the camera obscura had been known since ancient times. It was first detailed in writings by Leonardo da Vinci. Meaning literally "darkened room," it was originally a room completely sealed from light except for a very small hole in one wall. For centuries the technique was used for viewing eclipses of the Sun without endangering the eyes and, by the 16th century, as an aid to drawing; the subject was posed outside and the image reflected on a piece of drawing paper for the artist to trace. An image of the outside world - houses, trees, and even people - could be projected, upside down and reversed right-to-left, onto a wall or white screen placed opposite the opening. Later by the camera obscura was reduced in size until it became a small portable box. It was equipped with a lens and a mirror at a 45-degree angle, which reflected the image upward and focused it on a viewing screen. This was a great aid to artists in making sketches on location, but there was not yet a way to capture directly and permanently the camera obscura's images.



In 1038 AD, an Arab scholar named Alhazan described a working model of the camera obscura. Although Alhazan did not actually construct the device, his work would influence Roger Bacon who, in 1267 AD, created convincing optical illusions by using mirrors and the basic principles of the camera obscura. Later, he used a camera obscura to project an image of the sun directly upon an opposite wall. Throughout the middle ages, Bacon's ideas were adapted for astronomical observations of the sun. The camera obscura became a popular tool for safely viewing eclipses. Aidan Campbell, a pop artist, as put forth the proposition that all great artists of the 17th century used a Camera Obscura, in secret, to trace reality onto the canvas and this is why their vivid representations are so perfect.

Pinhole camera:

A pinhole camera is a simple camera without a lens and with a single small aperture, a pinhole – effectively a light-proof box with a small hole in one side. Light from a scene passes through this single point and projects an inverted image on the opposite side of the box.

The pinhole camera is a very simple piece of apparatus that demonstrates a number of points about the physics of light. The pinhole camera was first used in about 1000 AD and since then it has been a simple way of producing a correct image of a scene. Artists from the sixteenth century onwards used a pinhole camera to help them get the correct proportions for a painting. In its basic form it is simply a light-tight box with a pinhole in one end and a translucent screen of, say, tracing paper at the other. You can see a diagram at the top of the page. Light from the object goes through the pinhole and produces an inverted image in full color on the screen. This is because only light from one point on the object can reach a given point on the screen.

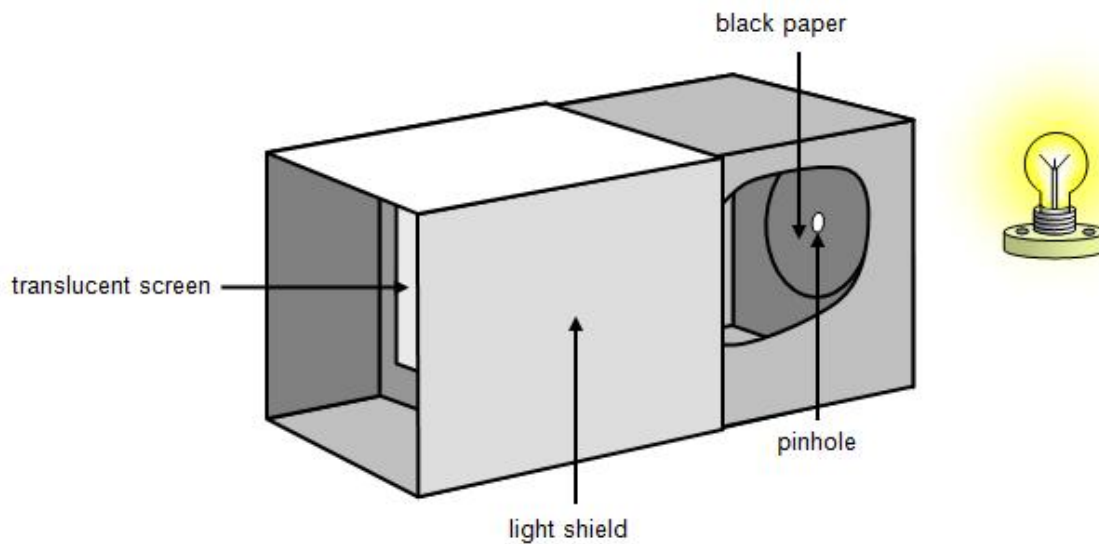


fig. Pinhole camera

Pinhole cameras need not be focused like ordinary cameras, they are always in focus. However, if you bring a pinhole camera very close to the object you are effectively increasing the size of the pinhole and the image will become blurred. You should notice that the inside of the pinhole camera is painted black to stop unwanted reflections inside. It is also helpful to have a light shield over the back to shade the screen. The fact that the pinhole camera gives a clear image is very good evidence for the fact that light travels in straight lines.

The First Photograph:



Born in 1765 in France, **Joseph Nicéphore Niépce** enjoyed a comfortable, middle-class upbringing. After careers teaching and serving in the military, he returned home in 1801 to manage his family estate, Le Gras. Niépce developed an interest in science when he began working with his brother, Claude, on various experiments and inventions.

When the craze for the newly invented art of lithography swept France in 1813, it attracted Joseph Nicéphore Niépce attention. His trials with lithography led to what Niépce later termed heliography and resulted in the earliest known surviving photograph made in a camera, which he produced in 1826 or 1827. On a summer day in 1827, Joseph Nicéphore Niépce made the first photographic image with a camera obscura. Prior to Niépce people just used the camera obscura for viewing or drawing purposes not for making photographs. Joseph Nicéphore Niépce's heliographs or sun prints as they were called were the prototype for the modern photograph, by letting light draw the picture.



Earliest known surviving photograph made in a camera. (View from Window at Le Gras.)

View from Window at Le Gras was produced by exposing a treated grey metal plate to light which he then etched and printed on a press. The term he used to identify this process was “heliography”: helios meaning sun, and graphein denoting writing or drawing in Greek. The image was taken with a camera obscura from the window of his upper-story workroom at his country house at Le Gras. He placed a polished pewter plate coated with bitumen inside the portable box, and removed the cap from the lens. After an eight hour exposure, the plate was pulled out and washed with a mixer of oil of lavender and white petroleum which dissolved away the parts of the bitumen. The result was the first unique and permanent positive image (above).

While on a visit to England in 1827, Niépce addressed a memorandum on his invention to The Royal Society, London, but Niépce was unwilling to reveal any specific practical details of his process, to which the Royal Society declined his offer. On December 14, 1829, Niépce signed an agreement with Daguerre which allowed for a ten-year partnership between the two inventors. Their plan was to perfect Niépce's invention and share the profits equally. Unfortunately,

Niepce died of a stroke on July 5, 1833, long before they had seen results. Daguerre's tenacity, however, assured the future of photography.

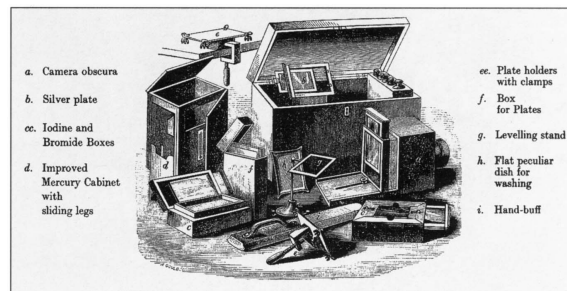
The Birth of Modern Photography:



Louis Daguerre was the inventor of the first practical process of photography. In 1829, he formed a partnership with Joseph Nicéphore Niepce to improve the process Niepce had developed. In 1839 after several years of experimentation and Niepce's death, Daguerre developed a more convenient and effective method of photography, naming it after himself 'the daguerreotype'.

Daguerre's process 'fixed' the images onto a sheet of silver-plated copper. He polished the silver and coated it in iodine, creating a surface that was sensitive to light. Then, he put the plate in a camera and exposed it for a few minutes. After the image was painted by light, Daguerre bathed the plate in a solution of silver chloride. This process created a lasting image, one that would not change if exposed to light. The daguerreotype gained popularity quickly; by 1850, there were over seventy daguerreotype studios in New York City alone.

The Daguerreotype process: The daguerreotype is a direct-positive process, creating a highly detailed image on a sheet of copper plate with a thin coat of silver without the use of a negative. The silver-plated copper plate had first to be cleaned and polished until the surface looked like a mirror. Next, the plate was sensitized in a closed box over iodine until it took on a yellow-rose appearance. The plate, held in a lightproof holder, was then transferred to the camera. After exposure to light, the plate was developed over hot mercury until an image appeared. To fix the image, the plate was immersed in a solution of sodium thiosulfate or salt and then toned with gold chloride. Exposure times for the earliest daguerreotypes ranged from three to fifteen minutes.



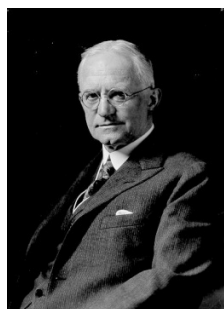
William Henry Fox Talbot was born into a very upper crust British family in 1800. When he was only 32, Talbot became a Member of Parliament. He was also bent towards art, and horribly frustrated that he didn't have the manual talent for it. Talbot eventually equipped himself with a camera obscura that cast traceable images on a piece of paper. But, even with that assistance, he complained, "the faithless pencil had only left traces on the paper melancholy to behold."

In 1833 he turned back to the problem of capturing images. He experimented with paper that he'd washed in table salt and treated with silver nitrate, so it would darken under sunlight. He made images by putting objects on the paper under the bright sun. At first, he could view them only under dim candles. Then he solved the problem of fixing the image so it could be seen in daylight. . After another year, he'd improved sensitivity until he could expose pictures by admitting light into his cameras. These images, however, were all negative ones. In 1840 he modified and improved this process and called it the calotype (later the talbotype). Talbot patented the process in 1841 and was reluctant to share his knowledge with others, which lost him many friends and much information. In 1842 Talbot received a medal from the British Royal Society for his experiments with the calotype. At that point, modern photography, as we know it, was born.



Federick Scott Archer was an English inventor of the first practical photographic process by which more than one copy of a picture could be made.

Archer, a butcher's son, began his professional career as an apprentice silversmith in London, then turned to portrait sculpture. To assist him in this work, he began experimenting with the calotype photographic process of William Henry Fox Talbot. In 1851 he described his wet collodion process, by which finely detailed glass negatives were produced; from these, paper positives could be printed. The plates had to be developed before the sensitized collodion dried after exposure, so that a darkroom tent and portable laboratory were needed for outdoor photography; but the new process produced such good results that it dominated photography for a generation. A lawsuit by Talbot claiming that the wet collodion was merely a variant of his own process was dismissed.



George Eastman: In the 1870s American photography was still time-consuming, difficult, and expensive. Equipment included a huge camera, strong tripod (a three-legged stand), large plateholder, dark tent, chemicals, water container, and heavy glass plates. When photographic chemicals among his cameras and supplies ruined his packed clothes on a trip to Mackinac Island, he became disgusted with the wet-plate process of producing photographs. Eastman experimented using dry plates. He was the first American to contribute to the improvement of photographic methods

by coating glass plates with gelatin, a gummy substance, and silver bromide, a chemical. In 1879 his coating machine was patented in England, and in 1880 he received an American patent for it. He sold his English patent and opened a shop to manufacture photographic plates in Rochester. To do away with glass plates, Eastman coated paper with gelatin and photographic chemicals. The developed film was stripped from the paper to make a negative. This film was rolled on spools. Eastman and William Walker created a lightweight roll holder that would fit any camera.

In 1888 Eastman designed a simple camera, the Kodak which was easy to carry and made focusing and adjusting the light unnecessary. With a hundred-exposure roll of film, it sold for twenty-five dollars. After taking the pictures and sending the camera and ten dollars to the Rochester factory, the photographer received his prints and reloaded camera. Eastman's slogan, "You press the button, we do the rest," became well known. In 1889 Eastman introduced roll film on a transparent base, which has remained the standard for film. In 1892 he reorganized the business as the Eastman Kodak Company. Eight years later he introduced the Brownie camera, which was intended for use by children and sold for one dollar. Eastman's invention allowed everyone to be a potential photographer, whereas before the invention of dry plates Photography was in the hands of professionals only.

Color photography: Before the invention of Autochrome process in 1907 pictures could only be produced in black and white. The Autochrome process, introduced in France in 1907 by Auguste and Louis Lumière, was the first practical color photography process. It used a color screen (a glass plate covered with potato starch grains dyed [orange, green and violet] to act as primary-color filters and black dust that blocked all unfiltered light) coated with a thin film of panchromatic (i.e., sensitive to all colors) emulsion, and it resulted in a positive color transparency. Because Autochrome was a color transparency and could be viewed only by reflected light, however, researchers continued to look for improvements and alternative color processes.

In 1935 Leopold Godowsky, Jr., and Leopold Mannes, two American musicians working with the Kodak Research Laboratories, initiated the modern era of color photography with their invention of Kodachrome film. With this reversal (slide) film, color transparencies could be obtained that were suitable both for projection and for reproduction. A year later the Agfa Company of Germany developed the Agfacolor negative-positive process, but owing to World War II the film did not become available until 1949. Meanwhile, in 1942 Kodak introduced the Kodacolor negative-positive film that 20 years later—after many improvements in quality and speed and a great reduction in price—would become the most popular film used for amateur photography.

First Digital camera: In 1975, the Eastman Kodak Company assigned a task to its engineering team. The task questioned whether a camera could be built using electronic parts and with an electronic sensor. Eastman Kodak Company electrical engineer responded to this in 1975 by creating the world's first digital camera prototype. The device was never meant to be mass produced, however.

The first digital camera invented by Steve Sasson was created from parts from other cameras. The device had parts that were taken from other cameras as the body and other Kodak pieces used for the rest. The whole device weighed over 8 pounds and was as large as a toaster of the time. The device was nowhere as quick or compact as modern digital cameras or camera phones. The protocol digital camera took 23 seconds to take a photograph and only produced images that were a tenth of a modern pixel. It then took 23 seconds for the image to process on to a cassette tape.



Types of camera

View cameras

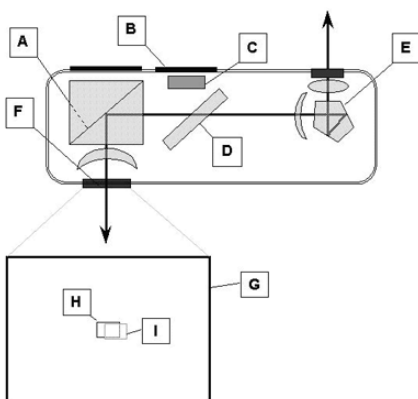
The view camera is a type of camera first developed in the era of the daguerreotype (1840s-'50s) and still in use today. View cameras are also known as Large Format cameras because they use large size films like 5x4 inches, 5x7 inches and 8x10 inches. These films were in sheet form and had to be loaded in a dark room into film holders. It comprises a flexible bellows that forms a light-tight seal between two adjustable units, one which holds a lens, and the other a viewfinder or a photographic film holder. At the other end of the bellows, the rear unit is a frame that holds a ground glass, used for focusing and composing the image and later it is replaced by a film holder containing the light-sensitive film for exposure. The front and rear units can move in various ways relative to each other, unlike most other camera types. This provides control over focus, depth of field, and perspective. The camera is usually placed on a tripod because of its large size.



With the advancement in technology hand held shooting was possible which replaced the use of tripod. External view finders and range finders were introduced which helped them to compose the image easily. Sinar, Horseman and Wista were few of the camera manufacturers who were famous in the market for large format cameras.

Rangefinder cameras

A rangefinder camera is a camera fitted with a rangefinder: a range-finding focusing mechanism allowing the photographer to measure the subject distance and take photographs that are in sharp focus. Rangefinder cameras were light weight and compact in size when compared to large format cameras. These could be used handheld and people could take number of photographs as film holders were replaced by film rolls.



- A. Beam splitter (semitransparent mirror)
- B. Light-gathering window
- C. Framelines projection
- D. Framelines projection semitransparent mirror
- E. Rotating mirror/pentaprism
- F. Viewfinder
- G. Viewfinder frame
- H. Static Image
- I. Secondary Image

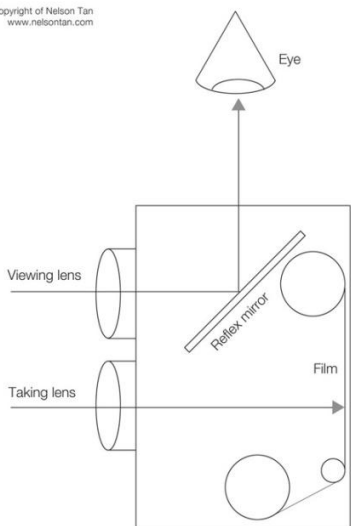
The rangefinder cameras were relative compact and they allowed photographers to quickly focus a camera lens, without guessing the distance to their subject. The smallness of the camera, along with the quick focusing ability led to what is often called a reportage style of photography. Subjects could be photographed as they normally happened, rather specially staged for the camera. The Leica II was the first commercially successful small 35mm format rangefinder camera. Its success ushered in the first modern compact camera system with interchangeable lenses. Nikon, Olympus, Canon, and Leica were some of the popular brands in the market.

Twin Lens Reflex (TLR)

A twin-lens reflex camera (TLR) is a type of camera with two lenses of the same focal length which were divided in to two different chambers. The top lens is used to focus and compose the subject and the bottom lens is used to capture the photo. The top lens consists of a 45 degree mirror and ground glass at the top of the camera, and a pop-up hood surrounding it for clearer view. The two units are connected, so that the focus shown on the focusing screen will be exactly the same as on the film. It was possible to take handheld photos using TLR cameras. Most of the TLR cameras were equipped with leaf shutters. TLR cameras most often used 120 film which could take 12 exposures.



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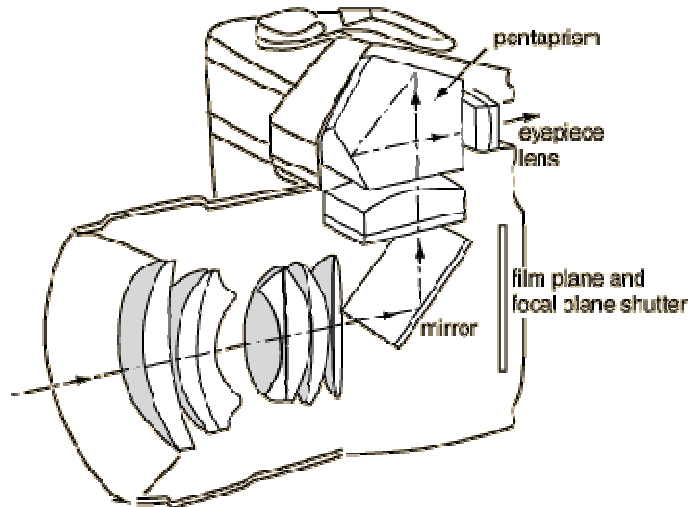
Cross-section diagram of a twin-lens reflex (TLR)

The twin-lens reflex camera was extremely popular in the 1950s, especially with photojournalists who had to struggle with large format cameras for capturing images because of its large size. The TLR represented freedom and faster working speed, making them the choice of photojournalists and many other photographers.

Twin lens reflex cameras' popularity declined in the 1970s, as film technology advanced quickly to make it possible to get great photos with 35mm film format. Rangefinder cameras such as Leica and Contax were quiet to operate, and they were even faster to shoot with, and significantly smaller than TLR cameras. With 35mm film, photographers could shoot 36 exposures per roll compared to 12 or 24 exposures with a TLR camera. Rollielflex, Yashica, Mamyia, Minolta were some of the popular brands in the market.

Single Lens Reflex (SLR)

The advantage of the Single Lens Reflex camera (SLR) is that it allows the user to see exactly how the image will appear at the moment the shutter is released. Light rays captured by the camera lens are bounced off a mirror behind the lens and up to a glass pentaprism, through which the rays are bent to enable them to pass through a viewing ocular. This allows the camera user to focus and compose the image before making an exposure. SLR manufacturers have historically used high quality glass elements, mirrors and prisms in the reflex system to obtain the brightest possible viewing image. SLR allowed the user to interchange the lens of their choice.



Early SLRs were built for large format photography, but this film format has largely lost favor among professional photographers. Film-based SLRs use the 35 mm format, 35 mm film comes in a variety of exposure lengths: 20 exposure, 24 exposure and 36 exposure rolls. The advantage of the SLR is that the eye sees approximately what the film will record, so that you can freely interchange lenses, use close-up lenses, etc. and still see what you will record on the film.

Digital Single Lens Reflex

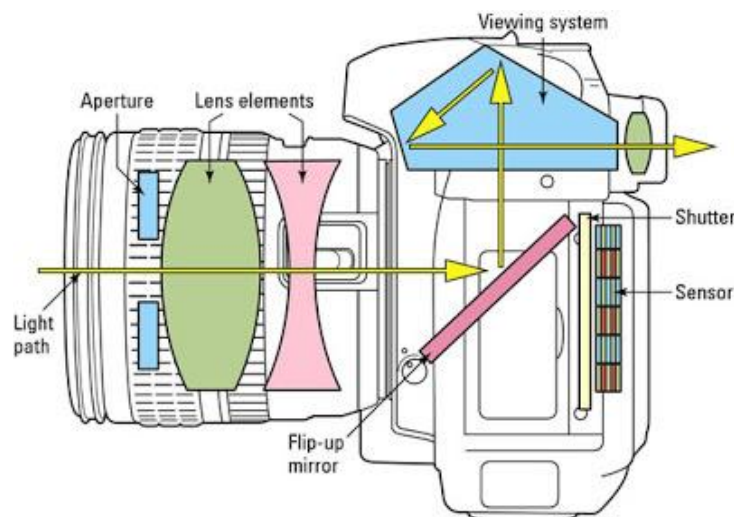
DSLR and SLR cameras both reflect light that enters through the lens using a mirror so that an image can be seen in a viewfinder. However, an SLR camera uses a film to record the image; and a DSLR uses CCD or CMOS digital sensors to record the image on a memory card.

DSLR cameras are great for budding photographers because they offer live previews and do not waste film when photographers make mistakes. There are more DSLRs available in the market so they tend to be cheaper. Film SLR cameras, on the other hand, offer slightly better quality of color, tone and contrast. The first DSLRs had poorer picture quality than film SLRs. Advances in digital technology, including the number of megapixels available, have almost completely erased this difference.

An SLR requires a roll of film containing silver halide crystals, which react chemically to light to form a photographic image. This chemical reaction needs to take place in a photo lab and requires a few hours to print. The film is not reusable, and can hold only upto 36 photos. A DSLR requires a flat memory card to store all its images in digital format. This little card can store thousands of images, and the user is able to delete any unwanted images instantly to make space for more. The card is reusable and the image can be seen instantly on camera or a computer, and can be printed right away with an external printer.

Both DSLR and SLR cameras use optical viewfinders to take pictures. But some DSLRs also come with LCD viewfinders, like in point-and-shoot digital cameras, which is handy for situations when an optical viewfinder cannot be used.

DSLRs allow photographers to store thousands of pictures on a memory card, while a roll of film in an SLR camera can only hold about 36 photographs. DSLRs also allow the photographer to preview the image after it has been taken, and make it easy to upload the photo to a computer to edit or print or delete.



Parts of camera

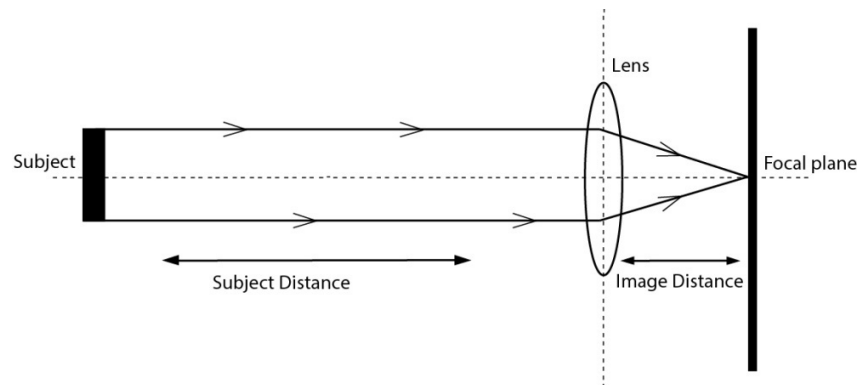
The Lens

A camera lens is an assembly of lenses used in conjunction with a camera body and its mechanism to make images of objects either on photographic film or digital sensor. An image is focused and formed in a camera by means of lens. The main function of lens is to concentrate the light and to focus the image. Cameras usually contain a combination of lenses that receive light rays from an object and form an image on the focal plane.

Focal Plane: The Position of the film or digital sensor inside a camera.

Subject Distance: The distance between the subject and the lens.

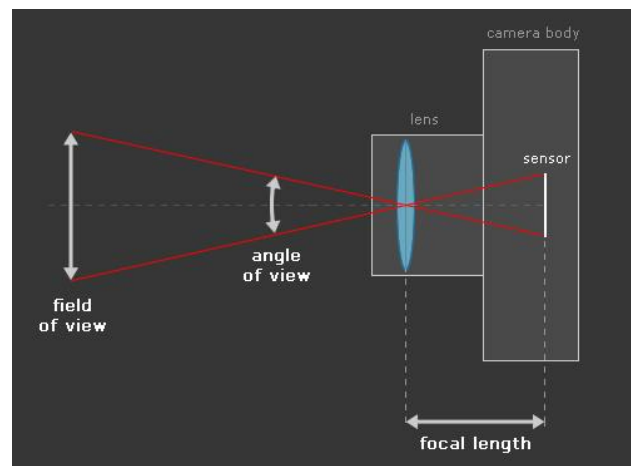
Image Distance: The distance between the lens and the focal plane.



Focal length

The focal length of a lens is the distance from the optical centre of the lens to the sensor (or film) when the lens is focused on an object at infinity. The focal length is fixed for any lens, and doesn't change when the lens is mounted on different camera bodies.

The focal length of a lens is one of the key specifications of a lens. For example, the focal length of the Canon EF-S 18-55mm f/3.5-5.6 IS lens ranges from 18mm to 55mm, depending on the zoom set by the lens' zoom ring. On the other hand, prime lenses such as the Canon EF 50mm f/1.8, have a fixed focal length that cannot be varied (ie, 50mm).



Angle of View

The angle of view is the angle of subject area that is projected onto the camera's sensor by the lens. In other words, it's the angle over which the sensor can "see" through the lens. The angle of view depends on the focal length of the lens, and the size of the camera's sensor.

Types of lenses

1. Standard Lenses or Normal lens

A standard lens is one with a mid-range focal length, typically around 50mm. They have an angle of view which is roughly the same as the angle that the human eye can comfortably view, meaning that they produce images which appear "natural" to the viewer.

Standard camera lenses usually have a fixed focal length and wide aperture, giving them excellent performance in low light. They are popular for a wide range of photography subjects, including landscapes, portraits, and candid shots.

2. Wide Angle Lenses

A wide angle lens is one with a short focal length. They provide an angle of view beyond that of a standard lens, allowing them to capture more of the scene in a single shot. Extreme wide angle lenses are known as fisheye lens; these can capture around 180 degrees, making for some intriguing, almost abstract photos.

Wide angle lenses are useful for photographing landscapes, cramped interiors, and other subjects which won't fit into a normal lens's field of view. Fisheye lenses take this even further, and are popular for photographing action sports like skateboarding and surfing, where their inherent distortion gives photos a dynamic feel.

3. Fish-Eye Lens

Fish-eye offer a distorted perspective of the scene so that objects are magnified in the center and diminish in size and clarity in all directions in proportion to the lens' shape.

Their angle of view is typically a full 180% but some fisheye lenses produce an even greater field of view (as much as 220 degrees in some cases). Some would consider the distortion an error, but others would see it as art.

4. Telephoto Lenses

A telephoto lens has a long focal length and provides a high level of magnification, allowing you to photograph subjects at a moderate to far distance. They tend to be bigger and heavier than other types of lens, although modern technological advances have made them more compact and easier to handle.

Telephoto lenses are popular for any type of photography where you can't get near to the subject, including wildlife and sports events. They are also commonly used in portrait photography, where a moderate telephoto lens will provide a natural, undistorted perspective.

5. Macro Lenses

A macro lens is one designed especially for close-up photography. They have a different internal construction from normal lenses which gives them very good sharpness and contrast, meaning that they produce some really eye-catching photos.

Macro lenses are useful for photographing any subject at very close range. Typical subjects include insects, animals, and plants, but they are also popular for taking extremely detailed photos of everyday objects.

6. Zoom lens

A zoom lens has the mechanical capacity to change its focal length. A zoom lens can be extremely convenient, because many zoom lenses can change their focal lengths from wide-angle to standard and from standard to telephoto. This eliminates the need to carry and change multiple lenses while shooting a subject or project. An optical zoom actually changes the amount of the scene falling on the image sensor. Every pixel in the image contains unique data so the final photo is sharp and clear.

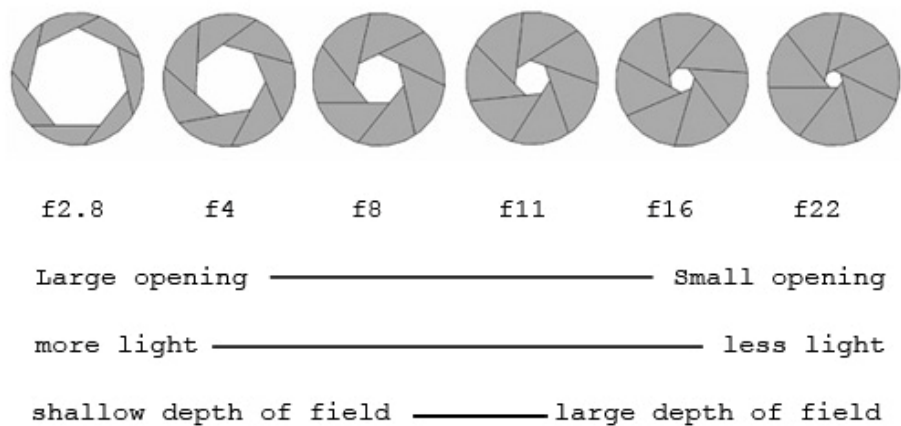
7. Prime Lens (Fixed-lens)

A prime lens, also known as a fixed lens, has a fixed focal length that is not modifiable. Prime lenses often have wider maximum apertures, making them faster. Wider apertures allow for brighter images in low-light situations, as well as greater control over depth of field.

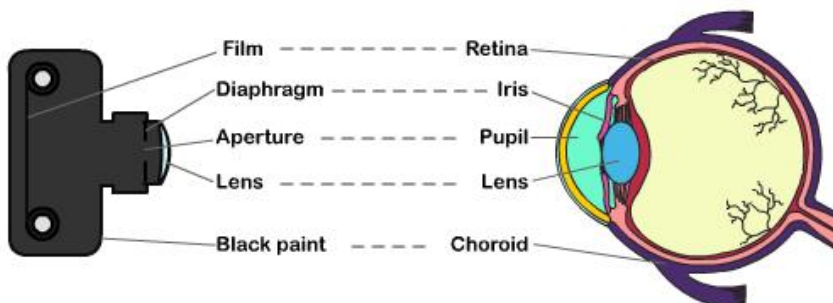
Focal Length	Lens Type	Common Subjects
6mm - 24mm (Angle of view should be 180 degree or more)	Ultra wide angle (fisheye)	Wide shots, panoramas and skylscapes, artistic, sports
18mm - 35mm	Wide angle	Interiors, architecture, landscapes
35mm - 85mm (50mm common)	Standard	General purpose, Portraits
85mm - 135mm	Short telephoto	Portraits, candid
135mm - 300mm	Medium telephoto	Close sports, action
300mm+	Super telephoto	Far sports, wildlife, nature, astronomy

Aperture

The main function of a camera lens is to collect light and deliver it to the camera sensor or film. The aperture of a lens is the diameter of the lens opening and is usually controlled by an iris. It is calibrated in f/stops and is generally written as numbers such as f/1.8, f/2.8, f/3.5, f/4, f/5.6, f/8, f/11 and f/16... The smallest f/stop number (f/1.8) allows more light to pass because they have larger opening, while the bigger f/stop number (f/16) allows less light to pass as they have smaller opening. This sequence of f/stop numbers will be same in all camera lenses irrespective of brand or place of origin.



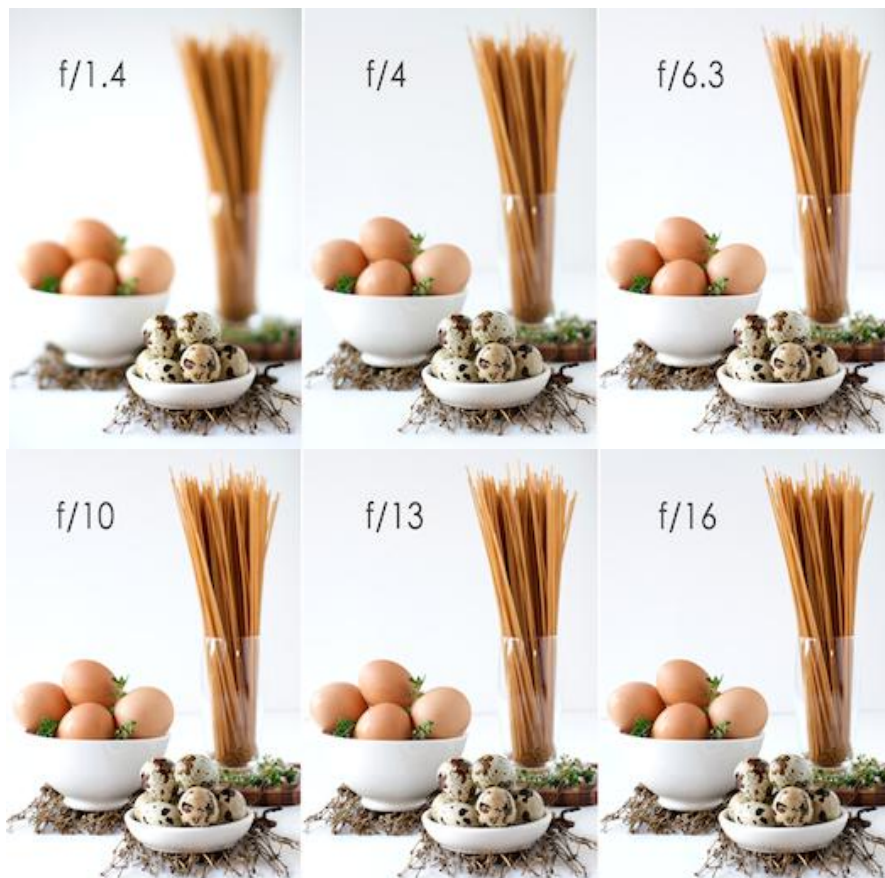
Aperture of camera lens works the same way that the iris of our eye works. When you are in dark your iris opens wide allowing more light to reach the retina. Soon after when you reach a spot which has bright lights your pupils will close up pretty quick. This is because your eye is monitoring how much light to let in and taking only how much light it needs. Just like the pupil in our eyes that open and close depending on the amount of light we see, the camera has an eye too, which is the Aperture. When our eyes need more light, the pupil opens up (creates a bigger opening) to let in more light. When there is too much light, the pupil gets smaller (creates a smaller opening) to let in less light. So, the Aperture does the exact same thing for the camera, but the Aperture "hole" opening lies within your lens.



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Depth of field (DOF)

The primary function of Aperture is to control the “Depth of Field”, which means how much of the image you want to be in focus. The size of the aperture has a direct impact on the depth of field, which is the area of the image that appears sharp. The simplest definition for depth of field is ‘the area of your image that is in focus.’ A large f/stop number such as f/16, (which means a smaller aperture) will bring all foreground and background objects in focus, while a small f/stop number such as f/1.4 will isolate the foreground from the background by making the foreground objects sharp and the background blurry. As a small f/stop number (f/1.4-bigger opening) allows more light to enter they are called fast lens.



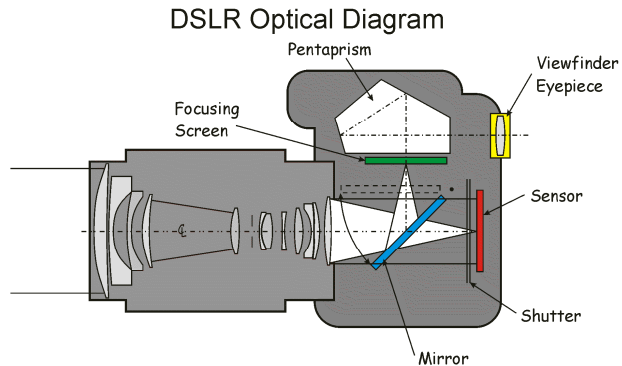
The two main functions of Aperture

- To adjust the amount of light to enter when shooting. A faster f-stop, bigger hole (smaller number) will let in more light, and less of the image will be in focus. A slower f-stop, smaller hole (bigger number) will let in less light, and more of the image will be in focus.
- To control how much area of the image you want in focus for the photograph. By making the bigger aperture (smaller f/stop number=more shallow depth of field) or smaller aperture (bigger f/stop number=large depth of field), you can control the amount of FOCUS.

Shutter

A camera shutter is a curtain in front of the camera sensor that stays closed until the camera fires. When the camera fires, the shutter opens and fully expose the camera sensor to the light that passes through the lens aperture. After the sensor is done collecting the light, the shutter closes immediately, stopping the light from hitting the sensor. The button that fires the camera is also called “shutter” or “shutter button”, because it triggers the shutter to open and close.

The duration of the light to fall on the film or camera sensor can be controlled by the shutter which is called ‘shutter speed’. Shutter speed, also known as “exposure time”, stands for the length of time a camera shutter is open to expose light into the camera sensor. If the shutter speed is fast, it can help to freeze action completely. If the shutter speed is slow, it can create an effect called “motion blur”, where moving objects appear blurred along the direction of the motion.

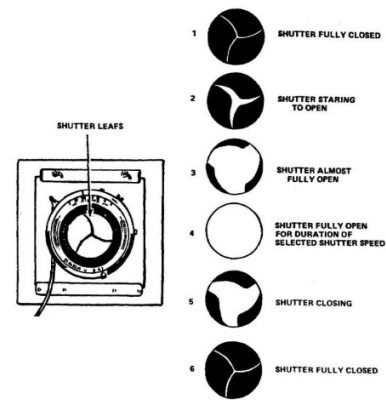


Shutter speeds are typically measured in fractions of a second, when they are under a second. For example 1/4 means a quarter of a second, while 1/250 means two-hundred-and-fiftieth of a second. Most modern DSLRs can handle shutter speeds of up to 1/4000th of a second, while some can handle much higher speeds of 1/8000th of a second and faster. The longest shutter speed on most DSLRs is typically 30 seconds. If you want longer exposure than 30 seconds then you have to switch from manual mode to Bulb mode. Bulb mode allows the photographer to take a picture for as long as the shutter button is pressed down.

There are two types of camera shutter

The Leaf Shutter

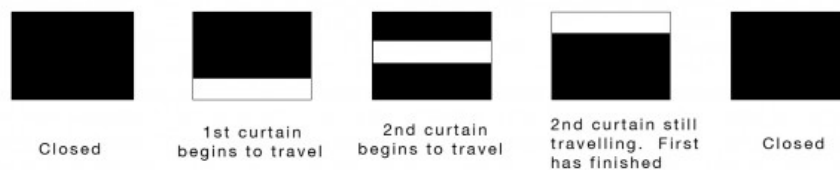
A leaf shutter is a shutter which uses a small number of identical overlapping metal blades, called the leaves. These leaves open and close in order to expose a photograph. It is usually placed near the iris within a camera lens. It is also called as ‘between the lens shutter.’ The leaves are arranged in a circular pattern, and made to move in a rapid fashion enabling a picture to be taken. The delay between opening and closing the blades determines the exposure time. The leaf shutter allows synchronizing flash at every available shutter speed, due to the fact that the whole picture area is exposed simultaneously, which is not always the case using the focal plane shutter. They are generally more compact and less noisy than focal plane shutters.



The Focal Plane Shutter

The shutter is the camera mechanism that opens and closes exposing the camera sensor to light coming through the lens. When light passes through the lens it is focused on the 'focal plane'. In a digital camera the focal plane is the camera sensor. Most modern DSLRs use a type of shutter called a 'focal plane shutter' where the shutter curtain is very close to, and directly in front of, the focal plane. Without the shutter a constant stream of light would be coming through the lens and hitting the sensor. There would be no control over the exposure. The shutter opening and closing determines the length of time that light is allowed to reach the sensor. There have been a range of designs and materials used in shutter construction. Most DSLRs use two 'curtains' to cover the sensor. During a long exposure, one shutter curtain opens exposing the sensor to the light. Then, after the right amount of time the second closes behind it.

Shutter Curtain at high speed



For a high shutter speed both curtains work together. As the shot is taken the first curtain opens a small amount. Then after a tiny amount of time the second curtain follows it. They both move across the sensor at the same speed creating a slit which scans across the sensor. The gap between the curtains determines the amount of light reaching the exposed part of the sensor. As the slit passes a point on the sensor it is exposed to the light and that point (pixel) gathers the data on the incoming light. A bigger gap between the curtains means a longer exposure for any given point on the sensor. The shutter can be made from any moveable cover that can be used to cut off the light. Shutter blades, a plate or a fabric curtain have all been used. Modern DSLRs normally use blades or plastic curtains which move up or down. This 'vertical focal-plane shutter' gives more precise control of exposure than a horizontal focal plane shutter. This is because the vertical shutter covers the vertical axis of the cameras' landscape view quicker than moving across the longer horizontal axis. But when compared to Leaf shutter the sync speed of focal plane shutter is limited to 1/250th of a second. At higher speeds, an increasingly narrow slit moves across the film plane, so a flash exposure would only expose a portion of the frame. Leaf shutters, on the other hand, open fully even at their highest speeds, allowing flash synchronization at all speeds.

ISO

ISO is the level of sensitivity of your camera to available light. ISO stands for the International Organization for Standardization. ISO or Film Speed (ASA) is expressed as a number, which is generally doubled as it gets higher. For example 50, 100, 200, 400, 800, 1600, 3200. A higher ISO setting makes your sensor more sensitive to light, meaning that you can take photos in darker conditions without the need to use a flash or tripod. However, a high ISO also creates more noise, reducing the image quality.

50 100 200 400 800 1000 1250 1600 3200 6400

Less Sensitive



More Sensitive

Low Noise



Higher Noise

ISO speed actually dates back to film cameras, where it is used to describe how sensitive a particular film is to light. It's obvious that digital cameras don't use film, but they do use a sensor which works in a remarkably similar way. Because people were used to using ISO with their film cameras, the term was adopted in digital cameras too. Digital cameras have a big advantage over film cameras when it comes to ISO - with film cameras, the ISO speed is a property of the film itself. This means that if you want to

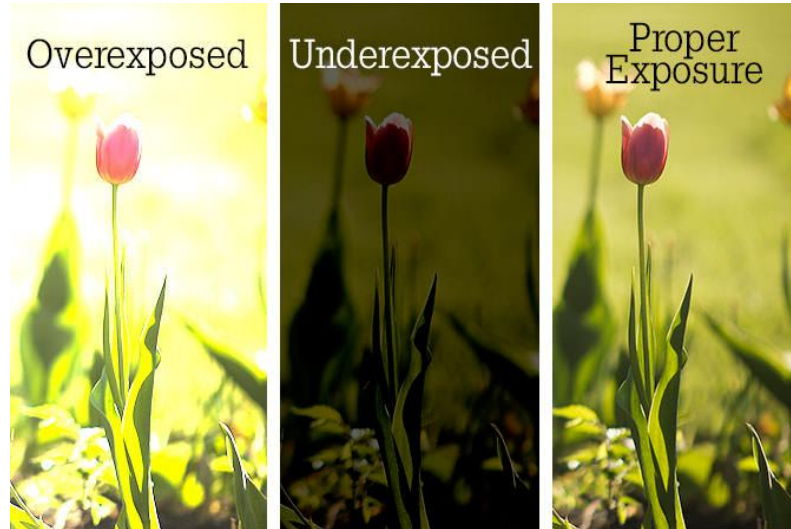


use a different ISO setting, you have to physically change the film. With digital, you can adjust the ISO setting at the touch of a button because it is controlled electronically.

The photographic film is made up of millions of light-sensitive silver halide crystals, which are called grain. The lower the film speed, the finer the grain; the higher the film speed, the fatter the grain. Larger silver halide crystals have more light sensitivity than smaller ones, so a higher ISO will be more sensitive to light than a lower one.

Camera Exposure

Exposure is the amount of light collected by the sensor in your camera during a single picture. If the shot is exposed too long the photograph will be 'over exposed' and the details will be washed out. If the shot is exposed too short the photograph will be 'under exposed' making the details not visible. Almost all cameras today have light meters which measure the light in the given shot and set an ideal exposure automatically.



Most people depend on the light meter which is fine, but if you know how to control your exposures you can get some creative and sometimes better pictures.

The three primary controls your camera uses for exposure are shutter speed (the amount of time the sensor is exposed to light), aperture (the size of the lens opening that lets light into the camera) and ISO (the sensitivity of the sensor or film). Shutter speeds are measured in seconds and more commonly fractions of a second. (1/2000 of a second is very fast and 8' seconds is extremely slow). Apertures are measured in something called f/stops (a very wide aperture is f/2.8 and a very small aperture is f/19). ISO is measured in numbers (ISO 50, 100, 200, 400, 800, 1600, and 3200).

The three elements are:

ISO – the measure of a digital camera sensor's sensitivity to light.

Aperture – the size of the opening in the lens when a picture is taken.

Shutter Speed – the amount of time that the shutter is open.

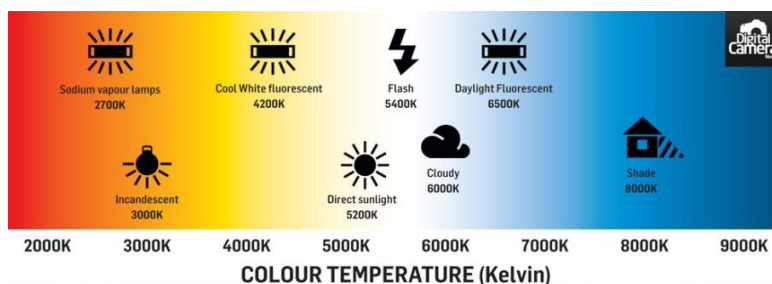
White Balance

When we look at a white object our eyes will automatically adjust to the lighting conditions, so that the object appears perfectly white to us whether we are indoors under a tungsten bulb or out in the bright sunlight. While our eyes are excellent at making this adjustment, digital cameras aren't, and the same object will appear different depending on the colour of light in the scene (something known as the "colour temperature"). This can leave our photos with a blue (cool) or orange (warm) tint.

When examining shots after capturing them, at times images can come out with an orange, blue, yellow color cast to them despite the fact that to the naked eye the scene looked quite normal. The reason for this is that the images in different sources of light have a different ‘color’ (or temperature) to them. Fluorescent lighting adds a bluish cast to photos whereas tungsten (incandescent/bulbs) lights add a yellowish tinge to photos. The range in different temperatures ranges from the very cool light of blue sky through to the very warm light of a candle. We don’t generally notice this difference in temperature because our eyes adjust automatically for it. So unless the temperature of the light is very extreme a white sheet of paper will generally look white to us. However a digital camera doesn’t have the smarts to make these adjustments automatically and sometimes will need us to tell it how to treat different light. So for cooler (blue or green) light you’ll tell the camera to warm things up and in warm light you’ll tell it to cool down.

Preset White Balance Settings

Auto: This is where the camera makes a best guess on a shot by shot basis. You’ll find it works in many situations but it’s worth venturing out of it for trickier lighting.



Tungsten: This mode is usually symbolized with a little bulb and is for shooting indoors, especially under tungsten (incandescent) lighting (such as bulb lighting). It generally cools down the colors in photos.

Fluorescent: This compensates for the ‘cool’ light of fluorescent light and will warm up your shots.



Daylight/Sunny: Not all cameras have this setting because it sets things as fairly ‘normal’ white balance settings.

Cloudy: This setting generally warms things up a touch more than ‘daylight’ mode.

Flash: The flash of a camera can be quite a cool light so in Flash WB mode you’ll find it warms up your shots a touch.

Shade: The light in shade is generally cooler (bluer) than shooting in direct sunlight so this mode will warm things up a little.

Composition in photography

Composition is the placement or arrangement of visual elements in a work of art. It can be to compose a sentence, a song or a picture, which merely means to put together elements in an orderly fashion. The term composition means 'putting together' and can apply to any work of art that is arranged or put together using conscious thought.

Photographic composition is one of the most important aspect of a great photograph. What you include in the image (and what you don't), and how you arrange the elements within the frame, contribute significantly to the overall success of the image. Will it have the impact? Will it convey your message?

The purpose of composing a photograph is to express the facts, ideas, or feelings effectively. Whatever the photographer is trying express guides the photography composition. Two photographers shooting the exact same scene at the exact same time may choose entirely different compositions, each to express their personal interpretation of the scene. For example, two photographers shooting the streets of Mumbai may have a different story to tell. One might get down low with a wide angle lens to emphasize a homeless person in the foreground, contrasting poverty and wealth in the city. The other photographer might shoot a horizontal frame to take in all the skyscrapers and the big city skyline. There's no right or wrong, but the elements included, and the perspective taken, should serve to strengthen the story being told.

All this implies that you actually do have a vision, or a story to tell with your image. In fact, that's one of the first keys to making a good photograph. Understanding why you want to take the picture, and analyzing what has attracted you to the scene. It allows you to emphasize the right elements in your picture so that your message is conveyed to the viewer.

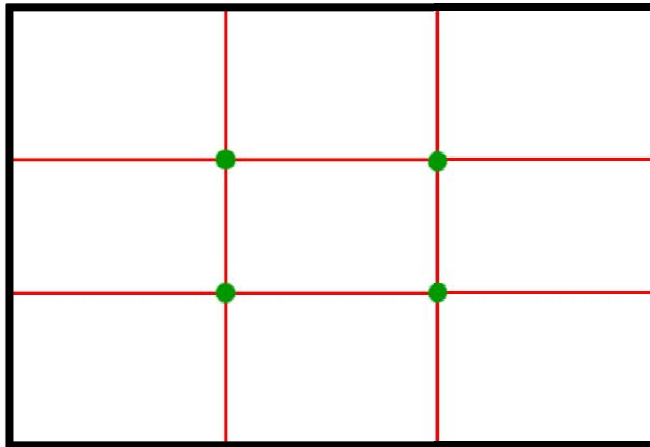
Positive and Negative Space

Positive space and negative space are terms that are commonly used in art and photography that have to do with composition. Positive space refers to the objects in the frame and negative space is the space between and around the objects in the frame. At first, it may seem like negative space isn't that important because it's just the space surrounding the focus of the photograph. This is a misconception though because too much or too little positive or negative space can make or break a photograph.

There are many ways in which positive and negative space are balanced in a photograph to achieve appealing composition. If there is too much negative space, the subject may be lost in the frame. If there is too little negative space, the focus of the photograph might not be what was intended.

Rule of thirds

The Rule of Thirds has been used for centuries and is probably the most important of all the composition techniques. In the rule of thirds, photos are divided into thirds with two imaginary lines vertically and two lines horizontally making three columns, three rows, and nine sections in the images. Important compositional elements and leading lines are placed on or near the imaginary lines and where the lines intersect. By locating your main subject at one of the four intersections you give the subject more emphasis than if it was right smack in the middle of the picture. The divisions can also be helpful to determine how much horizon you want. Most famous photographs or paintings in the world today have the rule of thirds applied to them in some way.

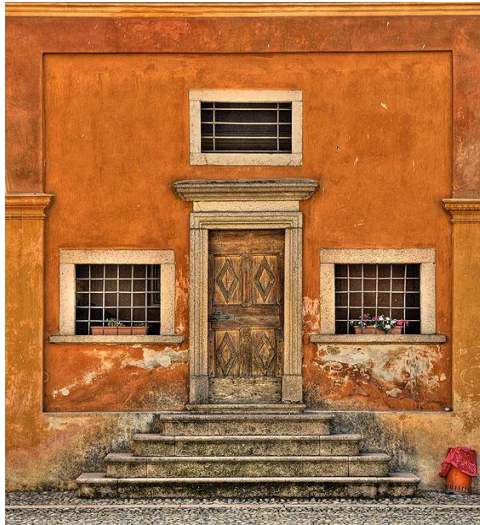


Leading Lines

Leading lines are lines within an image that leads the eye to another point in the image, or occasionally, out of the image. Anything with a definite line can be a leading line. Fences, bridges, even a shoreline can lead the eye. Leading lines are one of the most effective and under-utilized compositional tools available to photographers. They're used to draw a viewer's attention to a specific part of the frame, whether it's a person, or a vanishing point in the background of the frame. Our eyes are naturally drawn along lines and paths in photos, as they tend to make us feel as if we're standing within the photo itself.



Symmetry and Patterns



Symmetry in photography is creating an image which can be divided in two (either horizontally or vertically) equal parts where both the parts of the image look same or at least similar. Either of the parts can be a mirror image of the other one. Symmetry has been used in other visual mediums since long back. Symmetry brings the sense of unanimity and harmony. Symmetry can be either vertical, in which the left and right halves will be symmetrical or horizontal, in which the top and bottom halves will be symmetrical.

Pattern is the repetition of a visual design or element in a photograph. Displaying pattern in your image is similar to the repeated verses in a song. Patterns are visually rhythmic because of the following structure. Repetitive patterns particularly make for a melodious and harmonious image. Patterns have a very calming effect when they are expected and repetitive.



Patterns can be regular following absolute structures of similar shapes and sizes and can also be irregular with different and uncertain shapes or sizes. But, you can find regularity in those irregular natural patterns as well. To find an interesting pattern, you have to experiment shooting with different angles for the same subject. Sometimes patterns can be hidden and you need to have an eye for it to locate it. Patterns can be natural as well as man-made. Finding a natural pattern will need continuous emphasis and patience but they can be worth enough for your time and energy invested. A pattern can be found in a field brimming with lines of colored flowers or in a shop selling umbrellas.

Background

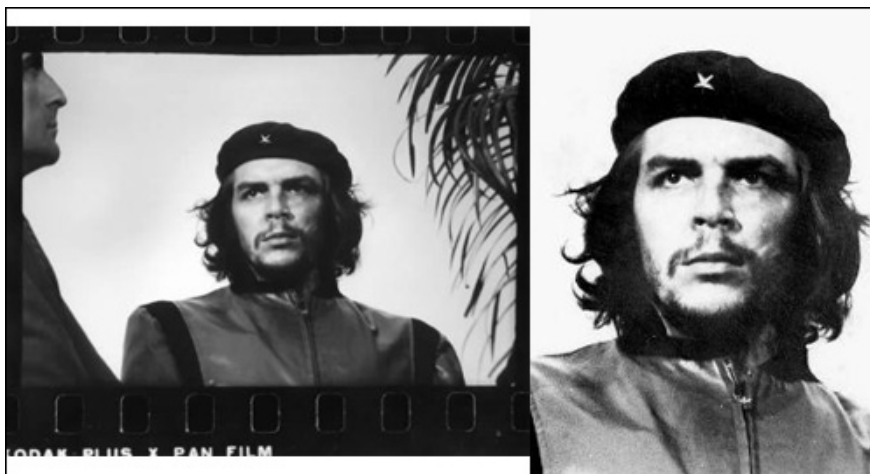
The background is almost as important an element in good composition as the camera angle. Too often it is overlooked when composing a scene since the photographer normally gives so much attention to the subject. Be particularly observant of the background to see that it contains nothing distracting. A tree or pole that was unnoticed in the distance behind a person when composing the scene may appear in the photograph to be growing out of his or her collar or supporting his or her head.



The background should be subordinate to the main subject in both tone and interest. It should also make the subject stand out and present it to best advantage. Blur are effective ways for separating the subject from the background. Blur can be accomplished by using a relatively large f/stop to render the background out of focus.

Cropping

Cropping refers to the removal of the outer parts of an image to improve framing, emphasize subject matter. Depending on the application, this may be performed on a physical photograph, artwork or film footage, or achieved digitally using image editing software. One of the most basic photo manipulation processes, it is performed in order to remove an unwanted subject or irrelevant detail from a photo, change its aspect ratio, or to improve the overall composition. It is considered one of the few editing actions permissible in modern photography along with tonal balance, color correction and sharpening.



Guerrillero Heroico by Alberto Korda — The cropped photograph of Che Guevara is one of the most recognizable photos on planet earth. Although the original is still a strong photograph, unlikely it would have become the icon it is without the crop.

Camera angle

The Bird's-Eye view

This shows a scene from directly overhead, a very unnatural and strange angle. Familiar objects viewed from this angle might seem totally unrecognizable at first. This shot does, however, put the audience in a godlike position, looking down on the subject. People can be made to look insignificant, ant-like, part of a wider scheme of things.

High Angle

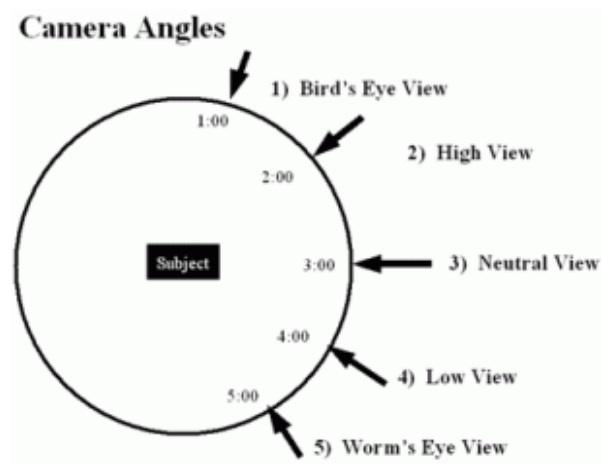
Not so extreme as a bird's eye view. The camera is elevated above the subject to give a general overview. High angles make the object photographed seem smaller, and less significant (or scary).

Eye Level

An eyelevel angle is the one in which the camera is placed at the subject's height, so if the actor is looking at the lens, he wouldn't have to look up or down. Eyelevel shots are incredibly common because they are neutral. This angle is the most "common view", being the "real-world angle" that we all are used to seeing.

Low Angle

Low angles help give a sense of confusion to a viewer, of powerlessness within the action of a scene. -this angle increases high and a sense of verticality, heightening the importance of the object photographed. A person shot from this angle is given a sense of power and respect.



Types of lens filters:

UV/Haze Filter



Ultraviolet light effects long distance shots or photographs taken at higher altitude. A bluish/purplish tint appears on the images, or there is a low-contrast haze on the images, which diminishes many details of the shot. Thus, you don't get clear images. To avoid this, you need to mount a UV filter that absorbs the ultraviolet light without adversely affecting the light. Images clicked with a UV filter have a warm, amber appearance. These transparent or clear type filters protect the lenses from scratch, dirt, water particles, etc.

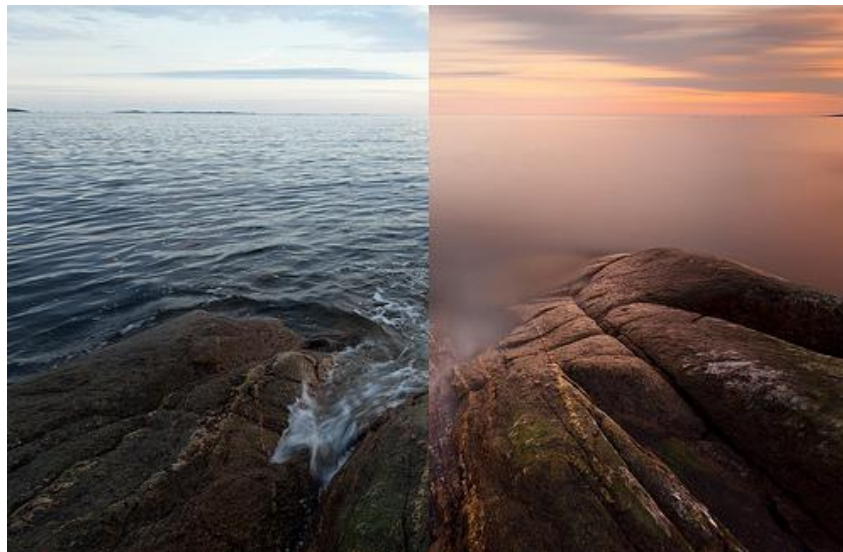
Polarizing Filter



Photographs taken in broad daylight usually contain reflected sunlight spread over the focus areas of the image. This takes the attention away from the focal points of the photo. Polarizing filters are used to darken light skies, and reduce reflections from water or glass surfaces. The contrast between important

objects in the image (say, sky and cloud) is increased. Atmospheric haze is also reduced by this filter. However, polarization is angle-dependent. The right angle between your thumb and forefinger (the rule of thumb) is needed to get the desired effect. The maximum effect of the polarization will be seen in the direction where your thumb points. However, the flip side of using this filter is the unnatural dark effect that the filter adds to the photograph.

Neutral Density Filter



Like the GND, the ND filters too are darkened or gray-toned. However, the gray-tone is throughout the lens, which absorbs calibrated degrees of light passing through the lens. These filters are used when there is a need to balance out contrast between the focal points and shadows. Motion blurring is achieved by this filter because of its low shutter speed options. These filters provide wider f-stops which slows down the shutter speed, thus, creating a foggy look to waterfall photographs. These filters are rectangular or circular type. You can stack more than one ND lens filter, but try not to overdo it because this may cause vignetting of the image.

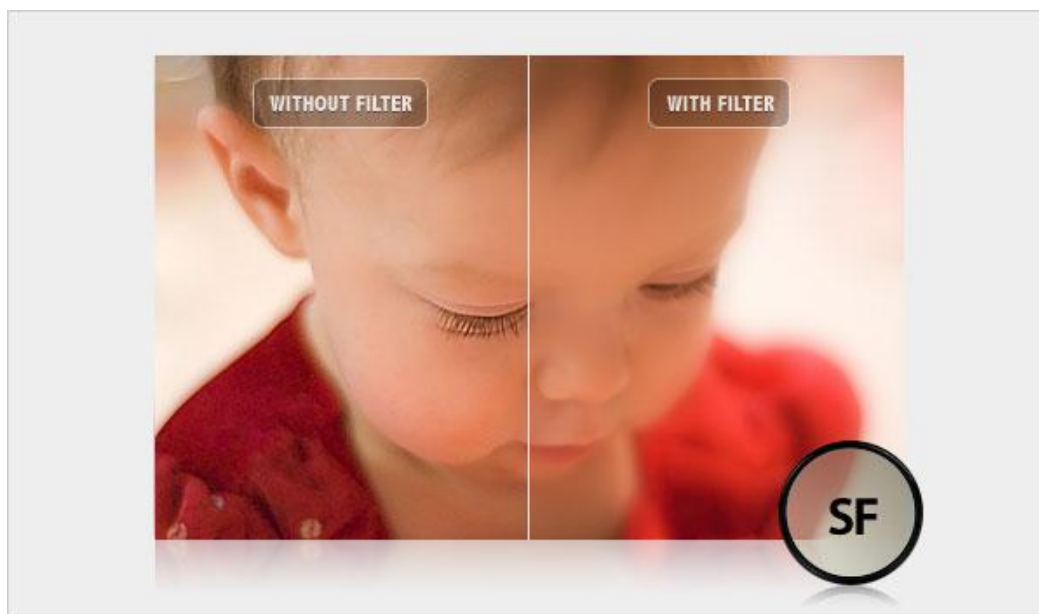
Graduated Neutral Density Filter



The GND filters have their half part clear, while their other half is dark. If you have bright spots in your photograph, you can align the dark part of the lens with it. This will help in balancing out the contrast in the image. A hard-edge graduated neutral density filter is used in situations where there is a high contrast ratio, like a landscape photo with bright sky. Here, the hard edge is aligned with the sky, so as to darken it. In a soft-edge graduated neutral density filter, there is a decrease in the darkness. So, you

have a gradual transition from dark to clear, throughout the image. Reverse GND filters have transition of dark to clear from the bottom to the top of the filter. Here, the dark part (hard-edge) is at the horizon and gradually decreases towards the top. So, in situations where you have to shoot the sun and its horizon, the contrast of the image is balanced out by using this filter type.

Soft Focus Filter



These filters reduce the sharpness of the image up to an extent that is barely noticeable. These images retain the sharp edges, but blur the rest of the image to create a soft focus point. Images taken by using these filters, can be reworked for correcting imperfect skin conditions. Though filters add the necessary effects and enhance your photos, they can even damage your image. The overall image contrast can reduce, or lens flare can be caused by light reflecting from the filter. Even physical vignetting can be introduced if the lens is not fitted properly. Thus, it is necessary to choose the right kind of lens for your photography purpose.

Light

What is light?

Light is a form of energy which our sense of sight can detect. It is made of electro-magnetic radiation and travels in a straight path.

What is the speed of light?

The speed of light is the speed at which light travels. It is about 300,000 kilometers per second. Nothing travels faster than light.

Why are there different colors of light?

There are different colors of light because they are light waves which have different wavelengths. Red light has the longest wavelength while violet light has the shortest wavelength.

What are the primary colors of light?

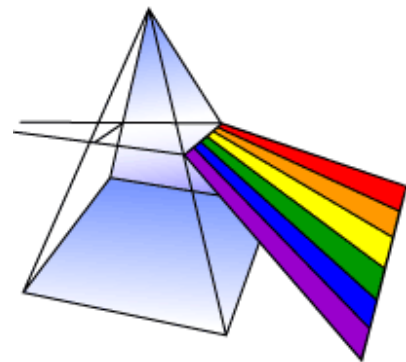
Red, green and blue are the primary colors of light. Mixing them in various ways will make all other colors, including white.

What is reflection?

The bouncing back of light waves when they hit an object with a very smooth and shiny surface, like a mirror, is called reflection.

What is refraction?

Normally, light travels in a straight path called a ray, however, when passing through transparent materials, like water or glass, light bends or turns. This is because different materials or mediums have different qualities. In each type of medium, whether it is air or water or glass, the wavelength of the light will change, but not the frequency. As a result, the direction and speed of the traveling light wave will change and the light will appear to bend or change directions.



One example of refraction is a prism. Prisms are unique in that each color of light is refracted to a different angle. So it can take white light from the sun and send out light of various colors. Lenses use refraction to help us see things. Telescopes help us to see things far away and microscopes enable us to see very small things. Even glasses use refraction so that we can see everyday things more clearly.

Source of Light

Natural light

Our main source of natural light is the sun. The sun is the most important source of natural light, as the vast majority of the light we receive comes from it. The moon and stars are also sources of natural light.

When you first begin photography, you use only readily available light around you. Available light photography is pretty much what it sounds like: using the light available to you at the scene without using any artificial light source. Available light photography is attractive to many because the lighting feels more natural. Portraits and other types of photography done with natural lighting tends to feel much more real and relaxed, not just because of the nature of the lighting but also, the more spontaneous feel of the shoot.

In its purest form, available light photography includes only natural lighting, with no modifications by the photographer. While this doesn't provide the photographer with too much control over the lighting other than deciding what time of day to shoot, natural lighting can still be absolutely exquisite to work with. Available light photography is best practiced outdoors during the daytime, as relatively natural light indoors create beautiful soft diffused light, and shooting by night is quite technically difficult though, but by no means impossible.

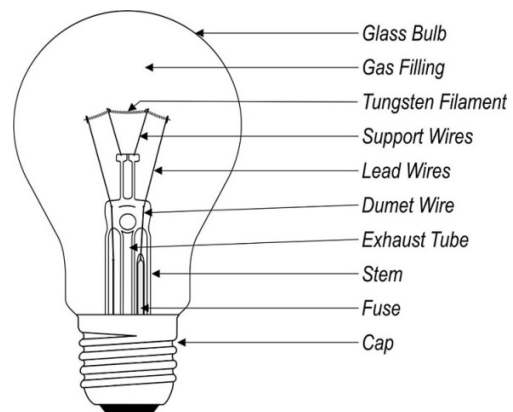
Artificial light

Humans have been able to create and control light for thousands of years. The earliest form of lighting was with fire such as burning wood, candles, gas or oil. Candles were made out of beeswax or tallow (animal fat). Oil lamps used plant or animal oil and a wick to burn. Now the most convenient source of artificial light is the electric light. There are four major types of artificial lights available:

Incandescent

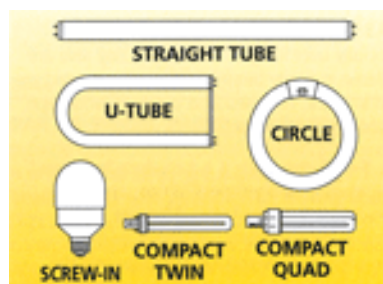
The most easily identifiable example of this type of light is the standard household light bulb. These bulbs emit light from a filament made of a metal known as tungsten and, thus, are sometimes referred to as tungsten lights. Movie sets also commonly use this type of lighting though in a considerably larger form than the average light bulb where they are often referred to as "hot lights."

The unmodified or direct incandescent lighting is harsh. At home, lamp shades are used to improve the quality of the light; on a movie set or in a photography studio, reflectors and diffuser are used. Though it can be harsh, incandescent light tends to exhibit a warm color temperature, which is desirable for many situations.



Fluorescent

Fluorescent light is easy to spot, fluorescent bulbs are those long, tubular shaped bulbs that give off a constant buzz and populate office buildings and retail stores around the world. Fluorescent light simply isn't very flattering unless one is intentionally going for a specific look, fluorescent light is rarely used in photography. Not only is it unflattering for portraits, it's difficult to work with due to the fact that there is so much variation in color temperature; there's the traditional greenish colorcast in addition to more modern versions that include "cool white," "warm white," and "daylight balanced." Such terms have little practical value to photographers. The only information that is known is that fluorescent bulbs are in use; we don't know the color temperature of the bulbs being used or even if all the bulbs in a room have the same color temperature. This can be a problem when selecting the correct white balance.



Light Emitting Diode (LED)

Relatively new to the world of photography, an LED is actually an electronic device that, when a current passes through it, produces light. Once capable only of producing red light, LEDs now commonly emit several colors, including green, blue, yellow, and white. LEDs also exhibit very stable color temperature. Like incandescent lighting, LED lighting tends to be harsh, and it may not be powerful enough for portraiture unless the light source is very close to the subject. For these reasons you will want to diffuse the light.



Flash and Strobe

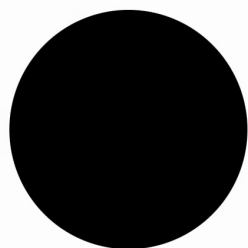
Flash and strobe lighting, work by emitting short bursts (lasting anywhere from 1/1000th to 1/50,000th of a second) of powerful light.

The light produced by flashes and strobes is of a harsh quality and should be modified in some way. Strobes can accommodate a wide range of modifiers (diffusers), such as softboxes, umbrellas, snoots, and flags. Many of these accessories can also be used with a flash, only if the flash can be used off the camera with the use of wireless or wired transmitter and receivers. On-camera flash can be easily diffused by bouncing it off a white ceiling or attaching a plastic diffuser to the flash head. Flash/strobe light is about the same color temperature as daylight, allowing you to mix these two sources of natural light and artificial light. The color of the light can be changed using different colored gel in front of the strobe making possible to create more dramatic light effects.

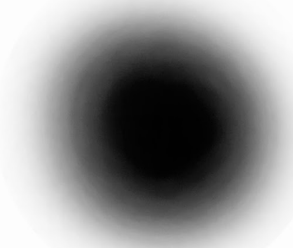


Light Accessories: (Light Modifiers)

In most studio uses, the lights will be used with some form of accessory modifier in order to achieve the desired quality of light on the subject. These typically include umbrellas, softboxes, reflectors, honeycomb grids, snoots, barndoors, bounce or diffusion panels, etc. In order to effectively use these light-shaping tools, it is important to understand the principles involved. Before understanding the light modifiers, it's very important to understand relative size of the light source to the subject. The smaller the light source, the harsher the shadows and contrasts will be. Take the Sun on a clear day, for example. Though the Sun is huge in reality, it's a small, bright light source shining on the much larger Earth. Consequently, when you look at your object, you'll see strong contrast and dark shadows and harsh edges. When the clouds roll in, look at the shadows again: They've softened and have more attractive, gentle feathering at the edges. Contrast has also been reduced. The clouds have scattered the light rays, diffusing and softening the light. Note that the clouds have effectively increased the size of the light source relative to the subject.



Shadow produced by hard light



Shadow produced by soft light

Softer light is generally a desired effect when working with all subjects, from people to highly reflective objects like jewelry. The specular highlight and the bright spot on an object is usually more pleasant when created by soft lights. Thus some of the light modifiers help us to diffuse the light and reducing the harsh contrast and shadows making it softer and pleasant.

Reflectors

One of the most common types of light modifiers is a board reflector. That is, a flat surface used to reflect or bounce light onto the subject. They are fairly basic to use and work great inside or outside of the studio. They come in a variety of sizes and colors and each type will achieve different results. The most commonly used colors are white, silver, and gold. When choosing which color to use, remember, a warm toned reflector (gold, for example) will give your photo a warm look. Alternatively, a silver reflector will bounce a cool light onto your subject.



Umbrellas

They look similar to rain umbrellas, but without the handle, umbrella modifiers are very affordable and are found in most studios. They come in several sizes and varieties: black outside with white or silver interiors, all white (called shoot-thru), and specialized ones with gold or zebra patterns (white-silver-white-silver) on the interior. The basic concept is that when a light is pointed at the center of the umbrella, the light rays are reflected back and scattered or diffused. Umbrellas are the ultimate in portability and speedy setup. Common for people photography, they're great for group coverage when two are used.



In the product photography studio however, the umbrella generally isn't your best choice. The inherent problem is light spill—lack of control over the light. Since the diffused light spreads out over a large surface, you would need to use “flags” or black cards to block the light from certain areas of your image.

Softbox

Softer light is generally a desired effect when working with all subjects, from people to highly reflective objects like jewelry. The specular highlight and the bright spot on an object is usually more pleasant when created by soft lights.



These light modifiers are the workhorses in the studio. Softboxes work similarly to umbrellas by scattering and softening the light, but in quite a different manner. They are rectangular boxes made of opaque, black material on the outside, lined with diffusion material on the inside (white or silver), and usually have an additional white diffusion panel called a baffle, which sits several inches away from light. The front of the softbox is open but kept covered with one more layer of white diffusion material. This produces a very soft light source and, because of the design, light is directional and therefore controlled. Should a photographer need additional

control, most good brands have a grid that can be fastened with Velcro at the front. Softboxes produce a rectangular catchlight on the subject.

On the negative side, softboxes are big and bulky. For onsite shoots, you'll have to take them apart, unless you have a minivan or SUV. Some brands are easier than other to assemble, but generally they're a pain in the neck and since time is money, might not be worth the effort. They cost substantially more than umbrellas and can strain a beginner's budget, depending on the brand and size. Softboxes come in many shapes and sizes, ranging from small ones that can be mounted on camera flash guns to enormous ones used to illuminate cars and trucks. Our studio is equipped with several 24" x 36" and 30" x 60" softboxes.

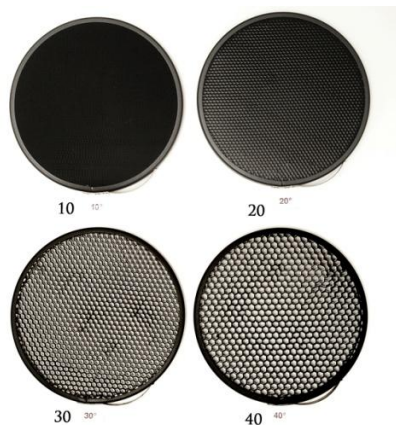
Barn doors

Barn doors have been around for decades and are simple black, metallic flaps that you mount at the front of your light to control the direction and width of the beam. They produce somewhat harder shadow edges than grids do. You can manually change the size of the beam by opening and closing the doors. The light shape produced is rectangular. They are commonly used for background lighting and sometimes to light a model's hair.



Grids

Grids are modifiers that attach directly to the front of the studio light. They focus the light into tighter beams and change the shadow edge feathering. They usually come in 10°, 20°, 30° and 40° hole-patterns. A 10° grid produces a very narrow beam of light with sharp shadows, while a 40° grid produces a broader beam and softer edges. The Grids can be used to add a bright highlight to a particular area of the subject or, when mounted onto a background light, to create a circle of light on a background. In fashion/people photography, they are often used to light the model's hair.



Snoots

This fixed cone-shaped device that are mounted in front of the lights. It creates hard shadow edges and, when used on backgrounds, produces circular shapes. A snoot is sometimes used to give a spotlight effect on objects or highlight a specific region of your image. They are commonly used for lighting specific area and sometimes to light a model's hair.



Color gels

A color gel is a transparent, colored sheet placed in front of a light or used in combination with other modifiers such as a grid. Used extensively in all areas of studio work, color gels give depth, dimension, and a mood to images. Available in just about every color on the spectrum, they are an essential part of a functioning studio. They're also cheap and portable.

Gobos

A gobo is modifier that creates a light pattern. They are usually metallic or glass-etched and are available in a multitude of different sizes and shapes. They're mostly used on background lights to create interesting backdrops, such as light passing through a window or a mottled effect. The Batman spotlight is a famous gobo example.



Leaf Breakup
Metal - \$30



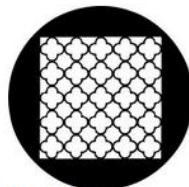
Vine Leaves
Metal - \$30



Winter Tree
Metal - \$30



Chinese Screen
Metal - \$30



Chinese Lattice
Metal - \$30



Abstract Leaves
Metal - \$30

Light Arrangement:

The Standard 3-Point Lighting Technique

The *Three Point Lighting Technique* is a standard method used in visual media such as video, film, still photography and computer-generated imagery. It is a simple but versatile system which forms the basis of most lighting. Once you understand three point lighting you are well on the way to understanding all lighting.

The technique uses three lights called the **key light**, **fill light** and **back light**. Naturally you will need three lights to utilize the technique fully, but the principles are still important even if you only use one or two lights. As a rule:

- If you only have one light, it becomes the key.
- If you have 2 lights, one is the key and the other is either the fill or the backlight.

Key Light

This is the main light. It is usually the strongest and has the most influence on the look of the scene. It is placed to one side of the subject so that this side is well lit and the other side has some shadow.

Fill Light

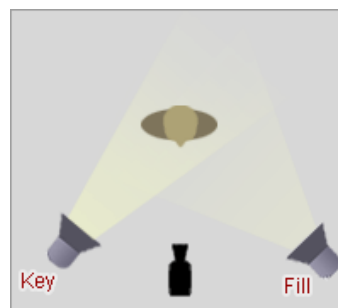
This is the secondary light and is placed on the opposite side of the key light. It is used to fill the shadows created by the key. The fill will usually be softer and less bright than the key. To achieve this, you could move the light further away or reduce its light intensity.

Back Light (Rim Light)

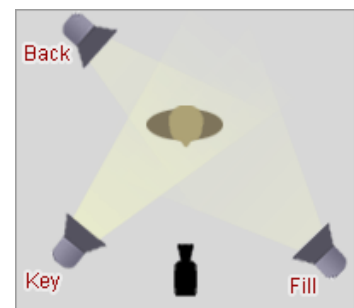
The back light is placed behind the subject and lights it from the back. Rather than providing direct lighting (like the key and fill), its purpose is to provide definition and subtle highlights around the subject's outlines. This helps separate the subject from the background and provide a three-dimensional look.



Key Light



Fill Light



Back Light

Adobe Photoshop basic tools:

A quick guide to **Adobe Photoshop's Basic Tools palette** with a description of each tool's functions and shortcuts. The hidden tools have not been covered here as this is just a quick start guide. For more in depth details and functions please refer to the relevant tutorials as they are presented. Essential for those brand new to Photoshop.

All the keyboard shortcuts are in ().



Move Tool (V)

Use this tool to move things by left clicking with the mouse. Usually it is used to move a **Layer** around after it has been placed.



Lasso Tool (L)

Use this to draw selections in whatever shape you would like. This tool is not very accurate for going around fine areas but works well if you just want to select a large area.



Magic Wand Tool (W)

This tool is used to select a color range. It will select the block of color, or transparency, based on wherever you click. In the Options Bar at the top, you can change the Tolerance to make your selections more/less precise.



Crop Tool (C)

The Crop Tool will crop your image or part of your image to the size you specify in the values boxes in the options bar at the top. Press the Enter/Return key, to commit the crop.



Eyedropper Tool (I)

This tool works by changing your foreground color to whatever color you click on. pressing the [X] key will toggle between your background and foreground color.



Healing Brush Tool (J)

Use this tool to repair scratches, specs and dust on images and to remove small areas that need cleaning up. Choose your cursor/brush size, then holding the [Alt] key, you select a nice/clean area of your image. Let go of the Alt key and paint over the area to be removed by holding down the left click on the mouse.



Brush Tool (B)

This tool paints on your image, in whatever color you have selected, and whatever size you have selected, by holding down the left click on the mouse. There are various options for the

brush tools sizes and shapes which can be found in the options bar.
It is also used on layer masks for showing or hiding parts of the image. (Advanced)



Clone Stamp Tool (S)

This tool is similar to the Healing Brush Tool (see above). You use it the exact same way, except this tool doesn't blend at the end. It creates a direct copy of the information from the first selected area to the second, ie, cloning the sampled area.



Eraser Tool (E)

This tool works like an eraser and erases the information wherever you left click and drag. If you're on a Layer, it will erase the information with a transparent. If you are on the background layer, it will erase with whichever secondary color you have selected.



Gradient Tool (G)

With this tool you can make a gradient of colors. It creates a blending of your foreground color and background color when you click and drag it.



Pen Tool (P)

Use this tool for making accurate selections. You use the tool by clicking to add a point. If you click and drag, it will change the shape of your path, allowing you to bend and shape the path for accurate selections and such. It takes a little time to learn this tool.



Horizontal Type Tool (T)

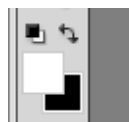
This tool creates text. Click a single point, and start typing. Click on the move tool to move the text around.



Hand Tool (H)

Use this for moving your entire image within a window. If you are zoomed in close and your image area is larger than the window, you can use the Hand Tool to navigate around your image. Left click and drag.

You can get to this tool at any time whilst using any other tool by pressing and holding the Space bar.



Color Picker

Almost at the bottom of the tool bar you will find your color boxes. Foreground (in the front) and Background (in the back). Click on either one to bring up the color select dialog box.

Q.1) What type of camera equipment and setting you will use to photograph this given situation?

- Client: Couple pre wedding shoot
- Location: Beach with white sand and Light house
- Time: Shoot in sunlight before sunset.

Ans. The camera equipment and settings used to photograph this situation are as follows:

- Lens:
- Aperture:
- Shutter Speed:
- ISO:
- White Balance:
- Artificial Light Source:

Q.2) What type of camera equipment and setting you will use to photograph this given situation?

- Client: NatGeo Magazine for Increasing number of Leopards in Sanjay Gandhi National Park
- Location: Sanjay Gandhi National Park
- Time: Shoot in sunlight OR after sunset

Ans. The camera equipment and settings used to photograph this situation are as follows:

- Lens:
- Aperture:
- Shutter Speed:
- ISO:
- White Balance:
- Artificial Light Source:

Q.3) What type of camera equipment and setting you will use to photograph this given situation?

- Client: Pre wedding couple shoot Under Milkyway
- Location: Dark sky, Spiti Valley, Himachal Pradesh
- Time: Shoot after sunset

Ans. The camera equipment and settings used to photograph this situation are as follows:

- Lens:
- Aperture:
- Shutter Speed:
- ISO:
- White Balance:
- Artificial Light Source:

Q.4) What type of camera equipment and setting you will use to photograph this given situation?

- Client: Cadbury Chocolate, New product launch
- Location: Indoor shoot- Studio
- Time: Shoot in sunlight OR after sunset

Ans. The camera equipment and settings used to photograph this situation are as follows:

- Lens:
- Aperture:
- Shutter Speed:
- ISO:
- White Balance:
- Artificial Light Source:

Q.5) What type of camera equipment and setting you will use to photograph this given situation?

- Client: Personal Project, Sadhus of Varanasi
- Location: Varanasi
- Time: Shoot in sunlight

Ans. The camera equipment and settings used to photograph this situation are as follows:

- Lens:
- Aperture:
- Shutter Speed:
- ISO:
- White Balance:
- Artificial Light Source: